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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/527,513

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David B Smathers

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10/14/2008

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EXAMINER

YANG, JIE

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

10/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/527,513	Applicant(s) SMATHERS ET AL.	
	Examiner JIE YANG	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 14-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This is to acknowledge the receipt of the "Declaration under 37 CFR §1.131" and the "Applicant arguments/remarks" filed on 06/25/2008. Claims 1-13 have been cancelled, claims 14-20 are pending in application.

Status of the Precious Rejection

Applicant's arguments and the Declaration under 37 CFR §1.131 filed on 06/05/2008, with respect to the rejection(s) of claim(s) 14-20 under 35 U.S.C. 103(a) have been fully considered and are not persuasive. Therefore, the rejections are maintained.

Based on the newly discovered references, a new ground(s) of rejection is added in view of newly discovered prior arts, which makes the present action non-final.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14-20 are rejected under 35 U.S.C. 103(a) as obvious over Yoshimura (US 6,911,162, thereafter US'162) in view of Miyanaga et al (US 6,544,917, thereafter US'917).

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JP'162 in view of US'917 is applied to the claims 14-20 for the same reason as stated in the previous rejection dated 1/23/2008.

Claims 14-20 are rejected under 35 U.S.C. 103(a) as obvious over Yamakawa et al (JP 11139877 A, thereafter JP'877) in view of Komatsu (US 6,242,374 B1, thereafter US'374).

Regarding claim 14, JP'877 teaches a method of mixing Si_3N_4 powder and metal Ti powder and sintering to obtain sintered compact (Abstract of JP'877), which reads on the limitations of providing an Me powder comprising a member selected from groups IVB, VB, VIB, and VIII of the periodic table; providing Si_3N_4 powder; blending and sintering the powders as recited in the steps a), b), and d) of the instant claim. JP'877 teaches sintering at temperature from 1300 to 1400°C under 1 atmosphere pressure (Table 1 and Col.4, paragraph [0015] of JP'877) and JP'877 teaches that the densified and sintered compact has a density $\geq 93\%$ (abstract of JP'877), more specifically the density is from 94 to 97% (Table 2 of JP'877), which reads the pressure consolidation said blend under heated conditions as recited in the instant claim. The density of JP'877's material overlaps the density range of greater than 95% as recited in the step e) of the instant claim. JP'877 teaches adding sintering

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aid, for example Al_2O_3 and Y_2O_3 into the sintering powder (Col.4, paragraph [0015] of JP'877), but JP'877 does not specify the sintering aid is MgO or SiO. However, MgO or SiO is functionally equivalent to Al_2O_3 and Y_2O_3 in term of sintering Si_3N_4 . This point is evidenced by US'374. US'374 teaches producing silicon nitride sintered body by sintering silicon nitride powder, sintering assistant agent and additives (including metals and metal oxides) (Col.2, lines 49-62 of US'374). US'374 teaches that the MgO is used as an addition component to promote a function as rare earth element and to enable the sintered body to be densified at a low temperature range (Col.7, line 66 to Col.8, line 14 of US'374). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Y_2O_3 and Al_2O_3 with MgO as a sintering aid in the process of JP'877, because MgO would be a functional equivalent to Y_2O_3 and Al_2O_3 as the sintering aids, as evidenced by US'374 and success could be expected. See MPEP 2144.06.

Regarding claim 15, it is a well known technique to machine the sintering product to final desired shape. This point is evidenced by US'374. US'374 teaches: "...in the conventional sintered body, it is necessary to post-work the sintered surface of the sintered body thereby to expose a worked surface having a desired strength, followed by producing a final product using

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the sintered body." (Col.2, lines 13-30 of US'374). Therefore, it would have been obvious to one skilled in the art to apply mechanical process after sintering in the process of JP'877 in order to obtain the desired surface conditions (Col.2, lines 13-30 of US'374).

Regarding claim 16, JP'877 teaches adding Ti from 5 to 70wt% in the mixture of metal and Si_3N_4 (Table 1 of JP'877), which overlapping the metal range from 40 to 80 at% as recited in the instant claim. JP'877 teaches adding about 1 wt% sintering aid in the mixture. Regarding MgO, US'374 teaches adding MgO from 0.3 to 3wt%, which overlapping the amount of MgO: 0.05-6wt% based on the weight of said Si_3N_4 as recited in the instant claim.

Regarding claim 17, JP'877 does not specify the metal element is W, however, W is a functional equivalent to Ti in term of sintering Si_3N_4 . This point is evidenced by US'374. US'374 teaches the Ti and W are changeable in term of adding as additives in the mixture for making sintering Si_3N_4 body (Abstract, Col.2, lines 49-62, Col.8, lines 55-63, and claim 5 of US'374). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Ti with W as an additive in the process of JP'877,

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because W would be a functional equivalent to Ti as evidenced by US' 374 and success could be expected. See MPEP 2144.06.

Regarding claims 18-20, JP' 877 teaches sintering at a temperature from 1300°C to 1400°C under 1 atmosphere nitrogen-gas-atmosphere (Table 1 and Col.4, paragraph [0015] of JP' 877), which reads on the limitations as recited in claims 18-20.

Response to Arguments

The Declaration filed on 6/25/2008 under 37 CFR 1.131 has been considered but is ineffective to overcome the US patent 6,911,162 B2 (Yoshimura) reference because the Declaration is not signed by all the inventors as required by MPEP 715.04.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY

/Roy King/

Supervisory Patent Examiner, Art Unit 1793